

**Department of Pesticide Regulation
Environmental Monitoring Branch
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**STUDY 301: PROTOCOL FOR MAKING THE WELL INVENTORY
DATABASE AVAILABLE TO USERS ONLINE USING GOOGLE FUSION®**

I. INTRODUCTION

In the mid-1980s, the Department of Pesticide Regulation (DPR) established the Well Inventory Database (WIDB) under the authority granted by the Pesticide Contamination Prevention Act (PCPA) (Food and Agricultural Code section 13152[c]). As required by the PCPA, all state, county, and local agencies that sample wells for pesticide residues are mandated to submit their ground water monitoring results to DPR for inclusion in the database. The database currently contains over two million sample analyses, including monitoring data from over 27,000 public and private wells sampled for over 380 different pesticides and pesticide degradates.

DPR receives well monitoring data from many agencies including the Department of Water Resources, the U.S. Geological Survey, and city and county health departments; however, 86% of the data in the database comes from the State Water Resources Control Board Drinking Water Program (formerly California Department of Public Health, formerly California Department of Health Services). DPR investigates all reported detections of pesticides in ground water. DPR also posts an annual report that summarizes all well sampling results reported and describes the actions taken by DPR to respond to any reported detections (CDPR, 2016b). In addition, DPR uses data from the database to evaluate and guide our Ground Water Protection Program monitoring and research activities.

Monitoring data have also been used by academic institutions, governmental agencies, and members of the public to determine whether pesticides contaminate ground water in their local area, county, or statewide.

The Well Inventory Database includes the following information:

1. Well location by county, meridian, township, range, and section
2. Well type (domestic, agricultural, industrial, large water system)
3. Study name the well sampling was performed under and sampling agency
4. Sample date, analysis date, analyzing laboratory
5. Chemical analyzed, concentration reported, method detection or reporting limit
6. Unusual or important notes about the detections or analytical method
7. Legal agricultural use determination (point or non-point source determination)
8. Year the record was included in the Well Inventory Report

Historically, data from the database could be requested from DPR by contacting the database manager or through the Public Records Act process (CDPR, 2016). In an effort to make water quality data more easily accessible DPR plans to make the entire database available online in both tabular and graphical formats using Google Fusion® ([Google](#), 2016).

II. OBJECTIVE

This project will make data in the WIDB available to the public in both tabular and graphical formats. The user will be able to easily get summary data for all sampled wells or details for each detection.

III. PERSONNEL

Project leaders:

Vaneet Aggarwal—Online interface coordinator

Craig Nordmark—Data compilation and verification

IV. PROJECT PLAN

Database Details

The WIDB data will be separated into three levels of increasing detail: [Overview](#), [Pesticide Summary](#), and [Detection Detail](#) tables. Due to file size limitations in Google Fusion® the second level (Pesticide Summary) will be split into three regional files: North, Central, and South. Well locations will be listed by county, the county-meridian-township-range and section (CMTRS), the unique well key assigned to all wells in the WIDB, and a randomized latitude and longitude based on the CMTRS of the well (to allow plotting by Google Fusion®). These identifying features will be common across all of the data levels.

The three data level tables will consist of the following fields:

- a. [Overview](#): This table contains **summary data for each well** in the WIDB. For each well this will include: CMTRS, county name, well key, well type, assigned latitude, assigned longitude, the number of samples (chemical tests), the number of positive tests, the number of unique pesticides tested, the number of unique pesticides detected, the minimum and maximum dates the well was sampled, the number of agencies that have sampled the well, an indicator if some well data was excluded, an indicator for lines with excluded data whether all or only some of the results for that well were censored, and the state region (North, Central, South) where the higher detail well listing will be found.

- b. [Pesticide Summary](#): This table has a **separate line for each pesticide tested in a well**. These tables are split by the three regions to comply with table size limits. For each well and chemical pair this table will include: CMTRS, county name, well key, chemical number, chemical name, depth of the well (where known), well type, assigned latitude, assigned longitude, the number of samples analyzed for that chemical, the number of detections, the minimum and maximum concentration reported, the minimum/maximum reporting limit, the minimum/maximum sample dates, the total of all unique chemicals tested, the total number of unique pesticides reported found, the number of agencies that tested the well, an excluded data indicator, a reason for the exclusion, and the region where the well is located.
1. The North region consists of the counties: Alpine, Amador, Butte, Colusa, Del Norte, El Dorado, Glenn, Humboldt, Lake, Lassen, Marin, Mendocino, Modoc, Napa, Nevada, Placer, Plumas, Sacramento, Shasta, Sierra, Siskiyou, Solano, Sonoma, Sutter, Tehama, Trinity, Yolo, and Yuba.
 2. The Central region consists of the counties: Alameda, Calaveras, Contra Costa, Fresno, Kern, Kings, Madera, Mariposa, Merced, Mono, Monterey, San Benito, San Francisco, San Joaquin, San Luis Obispo, San Mateo, Santa Clara, Santa Cruz, Stanislaus, Tulare, and Tuolumne.
 3. The South region consists of the counties: Imperial, Inyo, Los Angeles, Orange, Riverside, San Bernardino, San Diego, Santa Barbara, and Ventura.
- c. [Detection Detail](#): This table has a **separate line for each reported detection** in the WIDB. Each listing will include: CMTRS, county name, well key, chemical code, chemical name, concentration reported, reporting level, well depth (where known), depth-to-water (where reported), sample date, report year when the detection was included in the Well Inventory Report, sample status (code), DPR point/non-point source determination (code), agency code, agency name, study number for the sample, the DPR status code for the detection, if the well is in a Ground Water Protection Area, DPR response (study or memo) for the reported detection, assigned latitude, assigned longitude, number of unique pesticides ever detected, total pesticides ever detected, list of all pesticides ever detected, and the year added to the online list.

Web Access

Data will be accessed through a link added to the external Ground Water web page. A short general description of the data will also be added to the web page near the link. This link will take the user to a second page with more detailed descriptions of the data detailing what the columns in each of the three levels of tables include and instructions on using Google Fusion®. This page will include the following additional links:

1. Google Fusion® WIDB data. The main portal for performing queries.
2. Static map and county list for the three regions used in the pesticide summary tables.
3. Individual links to the translation tables containing the explanatory text for any codes used in the Google Fusion® data. Each set of codes (i.e., Agency, DPR detection evaluation, Status) will be accessed through a separate link.

Data Formatting and Presentation

Data will be presented in a format that is easily understood by the public. The tabular data will be sortable and filterable by the end user. Data will also be presented in graphical (map) format to further aid the end user. The use of Google Fusion® tables and associated mapping capabilities will facilitate these goals. Since the data are presented in a static tabular format, updates will be made by appending the base tables with new information as it becomes available and then the revised table would replace the existing table on the website. These updates should be performed yearly.

Within each data table, users will be able to select the data they want using a menu-driven user interface, and then export (download) the selected data and map as a file to their own computer for their own use. This file would contain only the data selected by the user. The user can filter the data by any entries in any field in that table and sort the data prior to download. The data can also be viewed on the web page ([Figure 1.](#)) without exporting/downloading. Users will also be able to download the complete table if they choose to do so.

Data Errors—Excluded Data

The majority of the data in the database is reported to DPR by other agencies. The database contains raw data that was submitted to DPR before full review by the reporting agencies. Because DPR follows up on all reports of pesticide detections, we are aware of some errors, or likely errors in the data set. For the sake of completeness, these data will be available in the database, but will not display unless it is specifically requested by the user. These data will include reported detections with a high probability of being reporting errors, detections determined to be the result of point source contamination, and data from shallow monitoring wells positioned around pesticide test fields. Users will be able to check a dropdown box to display these data but they will not be seen in the default display. A list of Excluded Data codes is included in Appendix 2.

Confidential Data

In accordance with the provisions of the California Public Records Act (Government Code section 6250 et seq.) and the Information Practices Act of 1977 (Civil Code section 1798 et seq.), DPR cannot disclose the exact location of the wells that have been sampled or personal information about the well owners to the general public but may disclose data down to the section level (CDPR, 2016a). Government agencies may request confidential data following DPR's policy on release of well monitoring data (CDPR, 2007).

V. TIME TABLE

Winter 2015 – Compile data tables and conduct test runs of Google Fusion® tables. Allow DPR personnel to review and make comments. Consult IT for their suggestions and requirements for putting the tables online.

Winter 2016 – Complete data compilation and do beta testing internally of completed tables. Create all web pages and links.

Spring 2016 – Complete beta testing and make the data available online using a dedicated Google Fusion® account and password provided by IT.

Yearly updates of the data will occur in January of subsequent years.

VI. REFERENCES

CDPR, 2007. Policy on the Release of Well Sampling Data. Available at: http://www.cdpr.ca.gov/docs/emon/grndwtr/wellinv/data_policy.htm (verified May 26, 2016).

CDPR, 2016. How to Request Department of Pesticide Regulation Public Records. Available at: http://www.cdpr.ca.gov/public_r.htm#pra (verified May 26, 2016).

CDPR, 2016b. Well Inventory Report. Available at: <http://www.cdpr.ca.gov/docs/emon/grndwtr/wellinv/wirmain.htm> (verified May 26, 2016).

Google 2016. About Fusion Tables. Available at: <https://support.google.com/fusiontables/answer/2571232> (verified May 26, 2016).

Appendix 1. Example Tables

Overview Table

CMTRS	COUNTY_NAME	WELL_KEY	DEPTH	WCODE	WELLTYPE	RANDLAT	RANDLONG	# SAMPLES	# POS_ SAMP	# CHEMS	# POS_ CHEMS	MIN(SDATE)	MAX(SDATE)	# AGENCIES_ REPORTING	REGION	DNI	Has Censored Reports	# Censored
01M01S03W35	Alameda	100770		L	Large Water System	37.798775	-122.160144	121	0	119	0	6/7/2007	6/7/2007	1	Central			
01M02S03W21	Alameda	111684	495	Y	Industrial	37.745206	-122.199277	119	0	117	0	6/19/2007	6/19/2007	1	Central			
36S01S04W03	San Bernardino	85257		L	Large Water System	34.110741	-117.286864	691	0	55	0	10/5/1998	7/29/2014	2	South			
36S01S04W03	San Bernardino	85258		L	Large Water System	34.116401	-117.284888	236	0	66	0	2/5/1985	7/29/2014	2	South			
28M08N06W23	Napa	104002		S	Small Water System	38.537707	-122.493065	37	0	37	0	11/25/2013	5/22/2014	1	North			
57M09N04E28	Yolo	92928	57	T	Monitoring	38.602126	-121.556641	89	6	23	3	2/29/1988	2/29/1988	1	North	DNI	CEN	6
10M13S20E36	Fresno	91433		L	Large Water System	36.761787	-119.742139	229	16	72	2	1/3/1985	3/1/2005	1	Central	RE	CEN	1

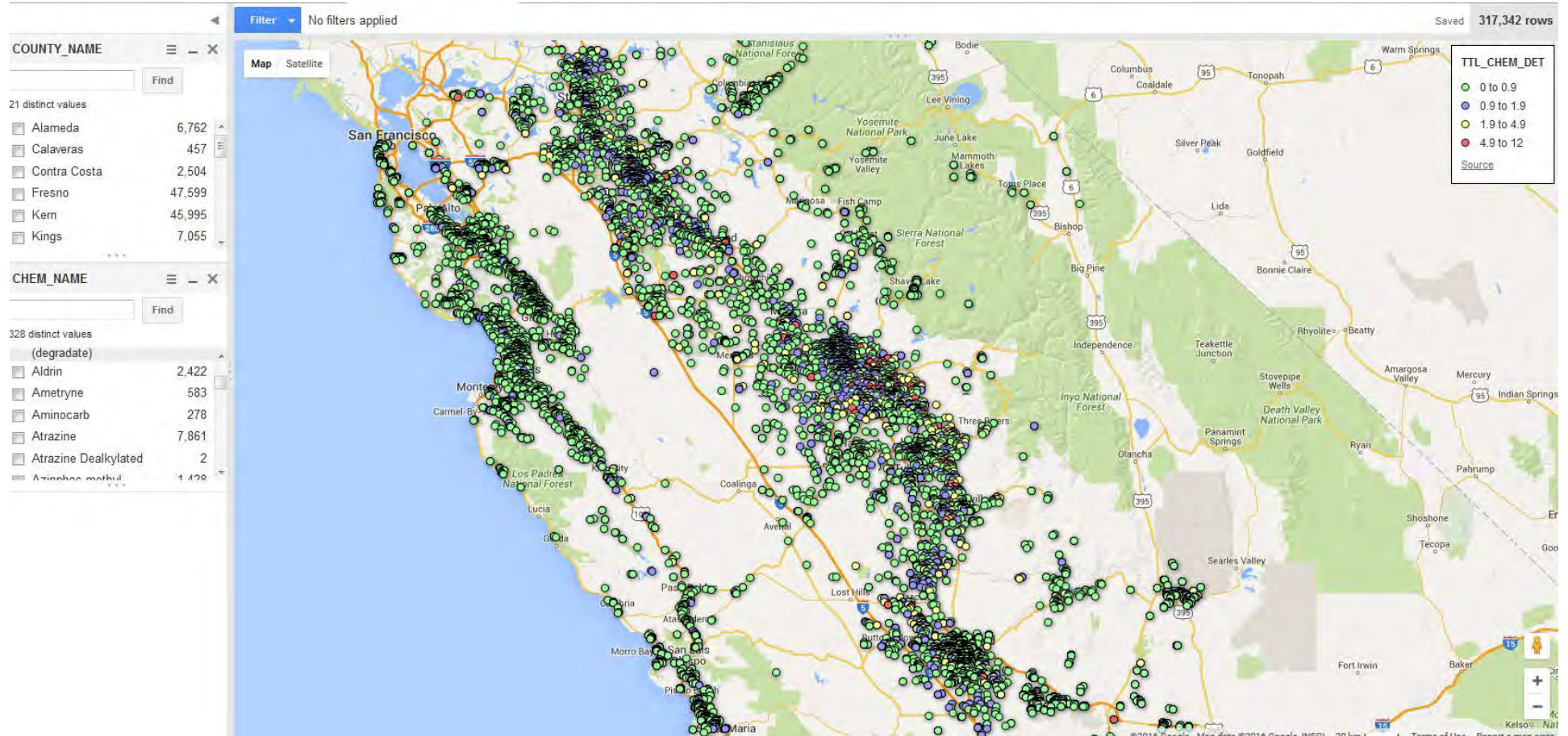
Summary Table (Central and South Regions)

CMTRS	COUNTY_ NAME	WELL_ KEY	NCHEM	CHEM_NAME	DEPTH	WELL_ TYPE	RANDLAT	RANDLONG	# SAMPLES	# POS	MIN (CONC)	MAX (CONC)	MIN (MDL)	MAX (MDL)	MIN (SDATE)	MAX (SDATE)	TTL_ CHEM_ TESTED	TTL_ CHEM_ DET	AGENCIES_ REPORTING	REGION	DNI	EXCL_ REASON
24M07S14E16	Merced	84975	104	Captan	266	Large Water System	37.321793	-120.443591	1	0	--	--	0.1	0.1	4/13/1994	4/13/1994	168	5	CDPH	Central		
20M11S17E24	Madera	83027	4051	DEA (degrade)	540	Large Water System	36.961155	-120.065149	1	1	0.007	0.007	0.014	0.014	4/15/2008	4/15/2008	166	1	CSWRCB	Central		
20M11S17E24	Madera	83027	4054	Azinphos-methyl-oa (degrade)	540	Large Water System	36.961155	-120.065149	1	0	--	--	0.042	0.042	4/15/2008	4/15/2008	166	1	CSWRCB	Central		
15M29S26E32	Kern	86110	183	DBCP		Small Water System	35.358966	-119.210392	15	3	0.01	0.91	0	0.1	9/24/1979	7/16/2013	84	1	CDPH* KERCO	Central		
50M07S08E02	Stanislaus	97092	5806	Metolachlor ESA (degrade)		Domestic	37.353284	-121.062892	2	2	0.292	0.599	0.05	0.05	8/13/2001	7/21/2009	22	1	DPR	Central		
19S01N12W25	Los Angeles	90741	385	Methyl bromide	399	Large Water System	34.139206	-118.096938	33	1	0.6	0.6	0.6	0.6	12/5/2006	12/5/2006	165	6	CSWRCB* CDPH	South	DNI	RE
19S01N12W25	Los Angeles	90741	385	Methyl bromide	399	Large Water System	34.139206	-118.096938	33	0	--	--	0	2	7/1/1985	12/5/2006	165	5	CSWRCB* CDPH	South	EXD	
37S12S03E21	San Diego	79650	636	2,4-D		Domestic	33.116716	-116.669151	1	1	5	5	0.5	0.5	5/14/1984	5/14/1984	2	2	SDCO	South	DNI	PS

Detection Detail Table

CMTRS	COUNTY_NAME	WELL_KEY	NCHEM	CHEM_NAME	CONC	RL	CODE	WELL_TYPE	DEPTH	DTW	SDATE	RPT_YR	STATUS	NorP	AGENCY	AGENCY_NAME	APFILE	DPR_STAT	In GWPA?	DPR response	rand_LAT	rand_LONG	Unique CHEMS Detected	Total CHEMS detections	ALL CHEMS DETECTED IN THIS WELL	ADD_YR
01M04S01W21	Alameda	107634	45	ATRAZINE	0.008	0.007	L	Large Water Sys.	200		05-JUN-2007	2012	U	I	5056	CALIF. STATE WATER RESOURCES C	GAMA	VLV		N103	37.56905396	-121.9800269	4	4	Atrazine *DEA *Prometon *Sulfometuron methyl	2015
01M03S02E07	Alameda	89808	1944	BENTAZON	0.6	2	L	Large Water Sys.			16-MAY-1990	1992	U	-	5060	CALIF. DEPT. OF PUBLIC HEALTH	Q092	NCDPR		Z180	37.68809041	-121.7922612	1	8	Bentazon	2015
04M20N02E08	Butte	88857	1944	BENTAZON	0.63	0.1	D	Domestic			14-FEB-1989	1989	P	N	4323	CALIF. DEPARTMENT OF PESTICIDE REGULATION	Z015	R			39.59783179	-121.7753683	2	4	Atrazine *Bentazon *Carbofuran *DEA *Diuron *Molinate *Simazine	2015
06M17N03W35	Colusa	91780	106	CARBOFURAN	0.04	0.01	T	Monitoring/Test	35		14-AUG-1997	2003	U	I	5000	U S GEOLOGICAL SURVEY	USG3	NCDPR		GW95	39.28333045	-122.1617649	9	10	*Thiobencarb	2015
07M02N01E18	Contra Costa	91954	183	DBCP	0.06	0.01	L	Large Water Sys.			07-DEC-2000	2001	U	N	5060	CALIF. DEPT. OF PUBLIC HEALTH	Q101	NPNL		N071	38.02045454	-121.9093248	1	1	DBCP	2015
10M15S20E09	Fresno	88248	2265	ALDICARB SULFONE	36	1	T	Monitoring/Test	50	57	19-MAR-1987	1992	P	-	1220	RHONE-POULENC AG. CO.	RP02	MWT	YES		36.64757777	-119.7998832	1	15	Aldicarb sulfone	2015
10M13S23E32	Fresno	83703	45	ATRAZINE	0.11	0.05	D	Domestic	60	19	20-APR-1994	1995	P	N	4323	CALIF. DEPARTMENT OF PESTICIDE REGULATION	0130	R	YES		36.75884207	-119.4947841	9	164	ACET *Atrazine *Bromacil *DACT *DEA *Diuron *DMN *Norflurazon *Simazine	2015
20M10S17E36	Madera	82995	385	METHYL BROMIDE (BROMOMETHANE)	1.3	0.5	L	Large Water Sys.			114-03-MAR-1992	1993	U	-	5060	CALIF. DEPT. OF PUBLIC HEALTH	Q093	NCDPR		Z216	37.01746604	-120.0585334	1	1	Methyl bromide	2015
24M07S12E18	Merced	82871	2019	NORFLURAZON	0.046	0.021	D	Domestic	91	32	05-OCT-2001	2002	V	N	4323	CALIF. DEPARTMENT OF PESTICIDE REGULATION	GW02	R	YES	N098	37.32348733	-120.6908979	2	2	ACET *Norflurazon	2015
27M14S03E29	Monterey	91511	186	DDT	0.12	0	T	Monitoring/Test			05-OCT-1984	1988	P	P	8493	CALIF. REGIONAL WQCB NO. 3 CEN	R822	PS			36.69062559	-121.6579434	3	4	DDE *DDT *Endosulfan	2015
33S04S06W16	Riverside	83797	106	CARBOFURAN	0.5	0.5	I	Irrigation	81	25		1985	X	-	4323	CALIF. DEPARTMENT OF PESTICIDE REGULATION	EPA1	NCDPR		EPA1	33.8202543	-117.5143414	1	1	Carbofuran	2015
33S04S06W16	Riverside	83797	106	CARBOFURAN	0.5	0.5	I	Irrigation	81	25		1985	X	-	4323	CALIF. DEPARTMENT OF PESTICIDE REGULATION	EPA1	NCDPR		EPA1	33.8202543	-117.5143414	1	1	Carbofuran	2015
43M09S03E28	Santa Clara	93633	594	TOXAPHENE	18	0.5	T	Monitoring/Test				1990	P	P	8493	CALIF. REGIONAL WQCB NO. 3 CEN	R834	PS		N008	37.12482382	-121.6555269	2	4	1,2-D *Toxaphene	2015
50M04S10E35	Stanislaus	97932	2265	ALDICARB SULFONE	13	1	T	Monitoring/Test	23		11-JAN-1991	1992	P	-	1220	RHONE-POULENC AG. CO.	RP02	MWT			37.54705997	-120.8428536	1	55	Aldicarb sulfone	2015
10M14S22E31	Fresno	87746	3849	IMIDACLOPRID	0.059	0.05	D	Domestic			30-05-MAY-2014	2015	V	I	4323	CALIF. DEPARTMENT OF PESTICIDE REGULATION	0182	SUI	YES		36.676774	-119.616964	6	71	ACET *DACT *Diuron *DMN *Imidacloprid *Simazine	2016

Figure 1. Google Fusion® Map Interface Example. This map displays the wells in the Pesticide Summary Table, Central Region, ranking the wells by the number of pesticides reported in that well. The dropdown filters on the left side can be used to further limit the data displayed by checking or unchecking boxes. All Pesticide Summary Table fields can be accessed for this filtering.



Appendix 2. Letter Codes Used in the Tables

AGENCY CODES	AGENCY TEXT
AECON	American Environmental Consulting Firm
CDPH	California Department of Public Health
CGY	Ciba_Geigy
CRWQCB1	California Regional Water Quality Control Board-Region 1
CRWQCB2	California Regional Water Quality Control Board-Region 2
CRWQCB3	California Regional Water Quality Control Board-Region 3
CRWQCB4	California Regional Water Quality Control Board-Region 4
CRWQCB5	California Regional Water Quality Control Board-Region 5
CRWQCB6	California Regional Water Quality Control Board-Region 6
CRWQCB8	California Regional Water Quality Control Board-Region 8
CRWQCB9	California Regional Water Quality Control Board-Region 9
CSWRCB	California State Water Resources Control Board
CSWRCBDWP	California State Water Resources Control Board - Drinking Water Program (took over reporting from CDPH)
CWS	California Water Service
DAVCY	City of Davis
DPR	California Department of Pesticide Regulation
DWR	California Department of Water Resources
FRECO	Fresno County
GLECO	Glenn County
IMPCO	Imperial County
KERCO	Kern County
LAKCO	Lake County
MADCO	Madera County
MARCO	Mariposa County
MODCO	Modoc County
OCNSDCY	City of Oceanside
RIVCO	Riverside County
RPAG	Rhone-Poulenc Ag Co.
SACCO	Sacramento County
SBCO	Santa Barbara County
SCCO	Santa Clara County
SCVWD	Santa Clara Valley Water District
SDCO	San Diego County
SFCY	San Francisco County
SLOCO	San Luis Obispo County
SMCO	San Mateo County
SOLID	Solano Irrigation District
STKESJWCD	Stockton-East San Joaquin Water Conservation District
SUTCO	Sutter County
USBLM	United States Bureau of Land Management
USDA	United State Department of Agriculture
USEPA	United States Environmental Protection Agency
USFS	United States Forest Service
USGS	United States Geological Survey
YOLCO	Yolo County
YUBCO	Yuba County

DPR_STATUS ¹	DESCRIPTION TEXT
ANPHU	Accepted Non-Point Source from Historical Use. Many Southern California wells have reported detections of atrazine, simazine and diuron and their degradates which resulted from historical applications of these herbicides to recharge basins. The areas are currently urban with no use of these pesticides. DPR will not conduct field further field studies for these detections according to Oct 2014 Memo.
CID	Confirmed/Verified Isolated Detection
DCNP	Degradate Confirmed, No Parent has been reported
DNP	Determined Not to Pollute at detected levels
E	Estimated Value-Below DPR response threshold of 0.04ppb
GS	Geologic Source
MW	Reported detection from Monitoring Well
MW-NC	Monitoring Well-Not confirmed by original agency
MWT ²	Reported detection from shallow Monitoring Well-Surrounding test fields. Not from Legal Agricultural Use.
NCDPR	Initial Detect Not Confirmed by DPR sampling
NCRA	Initial detect Not Confirmed by Reporting Agency
NLR	No Longer Registered at time of detects but was a registered pesticide in California at one time.
NPNLR	Non-Point Source, No longer registered.
NPR	Non-Point Source-Registered
NR	Never Registered in CA
P1987	Pre-1987 data dump accepted without further investigation
PS ²	Point Source
PSC ²	Point Source-Well Construction
R	Regulated: 6800a pesticide in GWPA or bentazon in Rice Area. DPR accepts all detections of regulated pesticides reported in GWPA as resulting from Legal Agricultural Use
RE ²	Reporting Error. This includes highly suspect entries of very high values reported for rarely detected pesticides.
RL	Regulated by label language prohibiting use in Del Norte and Humboldt Counties
SNP	Source determined not to be from pesticides
SUI	Source under investigation
VLV	Very Low Value. Well below DPR's 0.04 threshold for response level or any known health levels
EXCLUDED DATA CODES	These reports are of a questionable nature due to probable laboratory reporting errors or point source contamination of the well.
DNI	Data Not Included. The detection report(s) for this well are likely errors and has been excluded from normal display. This type of data includes: Point Source contamination, Laboratory reporting errors, and monitoring wells surrounding test plot fields. This data can be viewed if specifically filtered for.
CEN	Censored data. Some of the reported detections for this well are considered erroneous or the result of point source contamination. The remaining tests for this well are acceptable.
EXD	This data record has had some detections censored because they are considered errors. Viewing the associated DNI record will include both the erroneous and accepted data.

¹ Multiple DPR_status codes might apply to a single reported detection. In this case only the most applicable code will be used. For example, a reported detection might be both a reporting error (RE) and the pesticide is no longer registered (NLR). Only the RE code will be shown.

² These values may also appear in the Excl_Reason column of the Pesticide Summary Table. The meaning is the same.